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2 RORSCHACH SPACE RESPONSES AND ANGER1

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1 Abstract

2 This study aims to explore the relationship between three different subtypes of Space response,
3 distinguished by figure-ground relationship (S-fusion, S reversal and S-integration), to the
4 Rorschach test and feelings of anger and aggression. The Rorschach test, the State-Trait Anxiety
5 Inventory-2 (STAXI-2), and the Aggression Questionnaire (AQ) were administered to 50
6 university students. Scores on the STAXI-2 were positively associated with S-fusion and
7 negatively associated with S-integration. No significant associations of S subtypes with
8 aggression were found .The findings support the hypothesis according to which different figure-
9 ground relationships, shown in the subtypes of S responses, indicate different psychological
10 processes.

11

1 According to the Comprehensive System (Exner, 2003; Exner & Erdberg, 2005), Space
2 responses to the Rorschach test are coded when a white space area of the card is included in the
3 response. Although individuals may use the white space in two ways - integrating the white
4 space with other blot area or simply interpreting only the space - the Comprehensive System
5 codes either response as Space (S). The diagnostic meaning of this response depends on its
6 frequency in the Rorschach protocol. Consistent with the Comprehensive System, a value for
7 Space responses equal to or greater than four indicates the presence of considerable generalized
8 anger. This is thought to have a negative impact on the individual's psychological functioning,
9 especially on the affective regulation and on the interpersonal relationships. Recent studies on
10 the validity of the Rorschach Comprehensive System variables did not found empirical support
11 for the validity of Space responses (S) for test-based interpretations (Meyer, Hsiao, Viglione,
12 Mihura, & Abraham, 2013; Mihura, Meyer, Dumitrascu, & Bombel, 2013), but they did not take
13 into account the different subtypes of Space responses determined by the possible figure-ground
14 relationships.

15 Originally Rorschach (1921) assumed that the figure-ground reversal (e.g., “a rocket” at
16 card II in the white central space) showed oppositional trends such as polemical traits,
17 stubbornness and obstinacy in non-pathological individuals as well as negativity and oddness in
18 schizophrenic patients. Later on, Rorschach added that the diagnostic value of these figure-
19 ground reversal responses depended on Experience Balance (EB) style. He thus assumed that
20 these responses could indicate a tendency to turn opposition inwards, demonstrating a sense of
21 inadequacy and self-criticism in ideational individuals, whereas emotional individuals were
22 thought to direct opposition outward (Oberholzer, 1923).

1 Naively as it might seem now, years later Bohm (1967) assumed that the study of S responses
2 would allow psychologists to prevent crimes and psychological damage, depending on the
3 extratensive or introversive Experience Balance style. Most importantly, Bohm focused on a
4 particular phenomenon related to the white areas of the blots, namely the "figure-ground fusion".
5 It concerned those responses in which elements belonging to the figure and elements belonging
6 to the ground were seen on the same level, creating a new figure which was placed against a new
7 background. Bohm surveyed the original quality of the perception in these responses and he
8 noticed that their meaning and the psychological issues they raised were far from clear.

9 Somehow surprisingly, empirical research has not yet investigated the diagnostic value of
10 the Space responses resulting from the figure-ground fusion. On the whole, empirical research on
11 Space responses is still unexpectedly poor and so far it has yielded inconclusive results, most of
12 which cannot not be compared because of the different methodologies applied.

13 Some studies had investigated Space responses as a whole, while other researches had
14 differentiated between primary (including the white space alone) and secondary (white space
15 integrated with other black or colored portions of the blot) Space responses. Bandura (1954b)
16 considered unwarranted the practice of using primary and secondary Space responses as
17 measures of the same psychological process, after finding different associations between the two
18 subtypes of Space responses and the rate of reversal in the Necker Cube test. Moreover, those
19 seminal studies employed the constructs of opposition and aggression differently, and sometimes
20 did not even distinguish between them. Lastly, some studies used self-report measures while
21 other studies used measures obtained by observers.

22 Results have suggested a modest relationship between Space responses and anger, but
23 only a few studies distinguished the different subtypes of Space responses. Bandura (1954a)

1 found a moderate ($r=.35$) correlation between teachers' ratings of 81 high school students'
2 oppositional behaviour in class and the number of primary S responses. Carlson and Drehmer
3 (1984) found a positive moderate correlation ($r=.38$) between self-reported anger as a reaction to
4 stress and the number of primary S in a sample of 173 medical students. Stein (1973) valued
5 together primary S and secondary S, assigning a score of two points to the former and one point
6 to the latter. Significant positive correlations between the degree of rated oppositionality and the
7 total scores of Space responses were found (Spearman's $\rho = .461$). Martin, Pfaadt, and Ma
8 Kinster (1983) found a significant, though weak, correlation ($r=.20$) between the scores obtained
9 on the Elizur's Hostility Scale and the amount of S responses.

10 More recently, Gacono and Meloy (1994) reported high percentages of Space
11 responses >2 in children and in adolescents suffering from Conduct Disorder (35% and 41%,
12 respectively), in male adults diagnosed with Antisocial Personality Disorder (39%) and in
13 murderers who also committed sex crimes (50%). Last (2002) found a significant correlation
14 ($r=.38$) between the number of S responses and the defiance of odds in the face of failure
15 measured by a performance test administered to a sample of 30 female students.

16 Evidence of a lack or even of an inverse association of S responses and aggression has
17 also been reported. Schachtel (1951) found that the number of S responses was higher in public
18 school students than in adolescents in correctional schools and Rosen (1952) did not find any
19 association between scores on the MMPI Pd Scale and S primary responses in a sample of 109
20 psychiatric patients. Moreover, S responses were less frequent in patients diagnosed as
21 psychopaths than in other patients. Tegtmeyer and Gordon (1983) did not find correlations
22 between the Space responses and the behavioural rating of hostility or negativism reported by the
23 parents in a sample of 47 children. Piotrowski (1957) and Rausch de Traumbenberg (1970)

1 pointed out the positive nature of these Space responses. suggesting that they represented the
2 desire to self-assert and a tendency towards independence. Additionally, Klopfer and Davidson
3 (1962) considered the oppositional tendency as a desirable presence of self-affirmation.
4 Specifically, they considered reversal figure-ground as indicative of a greater opposition than the
5 figure-ground integration responses.

6 Along the same line, the Rorschach Performance Assessment System (R-PAS), recently
7 developed by Meyer, Viglione, Mihura, Erard, & Erdberg (2010), considered Space responses
8 resulting from figure-ground integration an index of effort, motivation, complex thinking, and
9 possibly, creativity (p. 333). They also include included scores for the use of white space as
10 figure ground reversal and as an integrated attribute.

11 In their recent review and meta-analysis of the Rorschach Comprehensive System
12 variables, Mihura *et al.* (2013) reported that the relationship of Space responses to criteria
13 assessing Oppositionality was around zero ($r=.01$). It should be noted that this meta-analysis
14 took into account studies that used externally assessed criteria to establish the validity of Space
15 responses and that seven out of the ten studies examined had been carried out on a clinical
16 population of psychopaths, violent crime offenders, and patients with Conduct Disorder. As an
17 external criterion, one study included in the meta-analysis used parents' evaluation of their child's
18 oppositional behaviour while another study was conducted on an alienated co-parent sample.
19 Therefore, these studies only took into account groups of individuals already showing aggressive
20 behaviour, while no studies were found that evaluated opposition as an internally experienced
21 emotion without acting out. Exner (2003) had pointed out that although a high value for S
22 responses (at least four Space responses) was indicative of the presence of considerable anger, it

1 did not explain if and how anger manifests itself. Some people could manifest the anger in their
 2 overt behaviour while others could experience anger "slowly burning" inside them.

3 Given the limitations of the previous researches, the present study aimed to investigate S
 4 response validity taking into account the different subtypes of Space responses and the different
 5 ways people could experience and express anger. Hence, the current study took into account
 6 three different subtypes of S responses:(1) reversal response (S-rev), i.e., a response concerning
 7 only the white space area, highlighting the figure-ground reversal (e.g., "missile" in DS5, card
 8 II); (2) figure-ground integration response (S-int), i.e., a response that integrates white details
 9 with other areas considering different areas as separate but related to each other (e.g., "missile at
 10 night with fire coming out of the bottom" in WS, card II); (3) figure-ground fusion response (S-
 11 fus), i.e. a response showing a fusion between figure and ground, considering white areas and
 12 light and shade/coloured areas on the same plane (e.g., "a face" in WS on card III; "a face" in
 13 WS or in DdS22on card X, "an armchair" in WS on Card VII reversed; "a monster (D1) with
 14 raised arms and lungs (D3) in its belly (DdS24)" on card III).

15 Consistent with the body of research described earlier, the current study aimed at
 16 exploring the association of the different subtypes of S responses with anger and aggression.
 17 Specifically, this study investigated: 1) the relationship between S responses and one's self -
 18 reported way of feeling and expressing anger; 2) the relationship between S responses and one's
 19 self -reported feelings of anger, hostility and opposition, and 3) the relationship of S responses
 20 with other variables in the Rorschach test empirically and conceptually related to the construct of
 21 aggression (AG, AgC, AgPot, AgPast). As suggested by Gacono and Meloy (1994), AgC is any
 22 content popularly perceived as predatory, dangerous, malevolent, injurious, or harmful; AgPot is
 23 any response in which an aggressive act is about to occur and AgPast is any response in which an

1 aggressive act has already occurred, or the object has been the target of aggression (Gacono &
2 Meloy, 1994, pp. 265-266).

3 Although the current study had primarily been designed with an exploratory purpose different
4 associations could be hypothesized between the subtypes of Space responses and the self-
5 reported experiences and expressions of anger. Reversal responses (S-rev) were not expected to
6 correlate with measures of anger and aggression, as these responses have been considered
7 associated with the need for autonomy and mastery (Fonda, 1977), and have been indicated as a
8 marker of Ego strength (Klopfer & Davidson, 1962). As Klopfer and Davidson (1962) found that
9 figure-ground integration responses (S-int) were even less indicative of opposition than reversal
10 responses, we did not expect to find associations of S-int with aggression. To the best our
11 knowledge no hypotheses have ever been proposed about the correlates of figure-ground fusion
12 responses (S-fus), although they have been proposed by Bohm (1967) nearly fifty years ago.

13 Method

14 *Participants*

15 The sample consisted of 50 students that participated as volunteers in the study. They
16 were Italian university students (25 male and 25 female), aged 20-25 ($M=22.7$; $SD=1.33$), with
17 the same level of education, equally split between humanistic and scientific educational
18 backgrounds. Participants were recruited from the University Dormitories through advertisement
19 requesting potential volunteers for psychological studies; they were informed about the scientific
20 purposes of this study, which was presented as a comparison of diagnostic tools for personality
21 assessment in a sample of young people belonging to a non-clinical population. All participants
22 gave their informed written consent to participate in the study.

23 *Measures*

1 The Rorschach test, the Italian version (Comunian, 2004) of the State-Trait Anger
2 Expression Inventory-2 (STAXI-2, Spielberger, 1999) and the Italian version (Fossati & Borroni,
3 2008) of the Aggression Questionnaire (AQ, Buss & Perry, 1992) were administered.

4 The State-Trait Anger Expression Inventory -2 was chosen because it takes into account the
5 various components of anger, as it measures both the intensity of anger as an emotional state and
6 the disposition to experience angry feelings as personality traits. Moreover STAXI-2 allows to
7 measure the direction of the expression of the anger (toward other people or objects in the
8 environment vs. holding it in or suppressing it) as well as the strategy to cope with it (e.g., by
9 preventing the expression of anger toward the environment or by calming down). The
10 Aggression Questionnaire was used because it allows to measure the physical, verbal, emotional
11 and cognitive components of the aggression. Moreover, State Trait Anger Expression Inventory
12 II and Aggression Questionnaire are the best known and most widely used measures of anger and
13 aggression available in Italian.

14 The Rorschach test was administered following the Comprehensive System guidelines
15 (Exner, 2003). These included side-by-side seating and use of standard location sheets to record
16 location during inquiry. The examiner used the standard instructions to obtain at least 14
17 responses and/or to constrain a high number of responses. S responses and AG responses
18 (Aggression Movement) were coded according to the Comprehensive System criteria.
19 Subsequently, S responses were classified in S-reversal, S-integration, and S-fusion.

20 According to the Comprehensive System, an AG response is coded when an aggressive
21 activity is occurring in the response; elevations in AG may indicate the presence of negative
22 and/or hostile attitudes towards others (Exner, 2003). As a recent meta-analysis did not find
23 evidence that AG is related to aggressive behaviour (Mihura *et al.*, 2013), it has been

1 hypothesized that as a movement response it implies the ability to mentalise aggressive urges and
2 the subsequent capability for deferral in acting on them (Meyer *et al.*, 2010).

3 Following the results reported in the reviews by Gacono and Meloy (1994) and by Gacono,
4 Gacono, Meloy and Baity (2008), AgC, Ag Past and Ag Pot were also coded. AgC is a measure
5 of the aggressive identification, ideation, or preoccupation. The validity of AgC was supported
6 by several studies that found a significant elevation of the AgC responses in clinical populations
7 suffering from Antisocial Personality Disorder and in individuals who showed aggression.
8 AgPast was thought to represent masochistic tendencies or internal representations related to
9 victimization. In the validity studies, AgPast resulted the only significant predictor of scores on
10 the Anger scale of the MMPI-2. It was higher in individuals with a history of violent or sadistic
11 sexual abuse who suffered from severe difficulties overcoming the negative effects of their
12 abuse, in pedophiles and in sexual homicide perpetrators. Moreover, some studies found that
13 AgPast was related to self-report anger scales. AgPot was assumed to be associated to sadism or
14 to an identification with predatory objects or preoccupation with predation. Validity studies
15 reported an increased number of AgPot in individuals suffering from Cluster B Personality
16 Disorders, in female offenders with Borderline Personality Disorder, in individuals who showed
17 difficulties in modulating one's aggressive urges.

18 The total number of responses with aggressive valence (SumAg) was also computed as the
19 result of the sum of AG, AgC, AgPast and AgPot responses.

20 The STAXI-2 is a 57-item self-report measure of the intensity of anger experienced at a
21 particular moment and the frequency with which the individual experiences, expresses, and
22 controls feelings of anger (Spielberger, 1999). The State Anger (S/A) scale comprises 15 items
23 that measure the intensity of angry feelings and the extent to which a person feels like expressing

1 anger at a particular time. Participants are asked to rate these items on a 4-point intensity Likert-
2 type scale (1 = not at all and 4 = very much so). The S/A items are equally split into three
3 subscales: Feeling Anger (FA, e.g., "I am furious"), Feeling Like Expressing Anger Verbally
4 (FLEAV, e.g., "I feel like yelling at somebody"), and Feeling Like Expressing Anger Physically
5 (FLEAP, e.g., "I feel like hitting someone"). The Trait Anger (T/A) scale consists of 10 items
6 that measure how often angry feelings are experienced over time. Participants are asked to rate
7 these items on a 4-point frequency Likert-type scale (1 = almost never and 4 = almost always).
8 The T/A scale comprises two subscales: Angry Temperament (AT, 4 items), which measures the
9 expression of anger without provocation (e.g., "I am quick tempered"), and Angry Reaction (AR,
10 6 items), which measures the expression of anger in response to an external stimulus (e.g., "It
11 makes me furious when I am criticized in front of others"). The remaining 32 items are rated on a
12 4-point frequency Likert-type scale (1 = almost never and 4 = almost always) and provide scores
13 on four scales: (i) The Anger Expression Out (AE/Out) scale consists of eight items that measure
14 how often angry feelings are expressed in verbally or physically aggressive behaviour (e.g., "I
15 do things like slam doors."); (ii) The Anger Expression-In (AE/In) scale consists of eight items
16 that measure how often angry feelings are experienced but not expressed and/or are suppressed
17 (e.g., "I withdraw from people."); (iii) The Anger Control Out (AC/Out) scale consists of eight
18 items that measure how often a person controls the outward expression of angry feelings (e.g., "I
19 keep my cool."); (iv) The Anger Control-In (AC/In) scale consists of eight items that measure
20 how often a person attempts to control angry feelings by calming down or cooling off (e.g., "I try
21 to soothe my angry feelings."). An anger expression index (AE) can also be computed as
22 $(AE/in+AE/out) - (AC/In+AC/out)$. The Italian STAXI-2 has shown adequate overlap with the
23 original version (Pearson correlations among scales of the original and Italian version in a

1 sample of bilingual participants ranged from .68 to .93), internal consistency (Cronbach's alphas
 2 of scales ranged from .67 to .93 in the normative sample) and robust factor structure (Comunian,
 3 2004). Subsequent studies shown the construct validity (e.g., a negative correlation [$r=-.41$] with
 4 cooperativeness, Balsamo, 2013) and predictive validity (e.g., trait anger predicted risky
 5 financial decisions, Gambetti & Giusberti, 2012) of the Italian STAXI-2.

6 The AQ is a 29-item self-report measure of the perceived levels of anger and aggression.
 7 Participants are asked to rate the extent to which each item is characteristic of them on a Likert-
 8 type 5-point scale (from 1 = "Extremely uncharacteristic" to 5 = "Extremely characteristic").The
 9 AQ provides a total score and scores in 4 scales: Physical Aggression (PA, nine items, e.g.,
 10 "Given enough provocation, I may hit another person"), Verbal Aggression (VA, five items, e.g.,
 11 "I can't help getting into arguments when people disagree with me"), Anger (AN, seven items,
 12 e.g., "I have trouble controlling my temper") and Hostility (HS, eight items, e.g., "I am
 13 suspicious of overly friendly strangers").The first two scale assess the motor or instrumental
 14 components of aggression; Anger represents the affective and emotional component of
 15 aggression, and includes psychological activation and preparation to aggression; Hostility
 16 represents the cognitive component of aggression, and concerns basic feelings of resentment and
 17 injustice. The Italian AQ (Fossati & Borroni, 2008) consistently replicated the factor structure of
 18 the original version and showed adequate internal consistency of the scales in both non-clinical
 19 (Cronbach's alphas of scales ranged from .55 to .89) and clinical (Cronbach's alphas of scales
 20 ranged from .51 to .89) samples. In the validation study, high AQ total and scale scores showed
 21 significant associations with: (i) high scores on self-reported novelty seeking and harm
 22 avoidance, and low scores on cooperativeness and self-directedness; (ii) low scores on secure

1 attachment and high scores on discomfort with closeness; (iii) high scores on measures of Cluster
2 B personality disorders (especially narcissistic, borderline, antisocial).

3 *Procedure*

4 A psychologist (the second author of this article) was the contact person, and she had the
5 task to explain the purpose of the research to potential participants and to collect their approval
6 and consent to participate. Approximately 70 percent of the students recruited gave their
7 informed consent to participate in the research.

8 The psychologist who administered the measure was not acquainted with participants and she
9 was blinded to the purpose of the study. All the tests were administered in a single session at the
10 premises of a department of psychology in a North-Western Italian university. The Rorschach
11 test was always administered first to avoid confounding situational factors, while the State Trait
12 Anger Expression Inventory-2 and the Aggression Questionnaire were administered in a
13 counterbalanced order. The study followed the APA ethical guidelines (American Psychological
14 Association, 2010).

15 *Data analysis*

16 All the Rorschach protocols were then independently coded by two further psychologists
17 on the variables of interest for the current study. If participants provided fewer than 14 responses
18 to the Rorschach test, their protocol would be considered invalid and would be excluded from the
19 analyses. For all the variables taken into account in the Rorschach test, the level of agreement
20 between coders was estimated by using Cohen's k . The total number of S responses and the sum
21 of S-rev, S-fus S-int, and Ag, AgC, AgPast, AgPot were computed. S responses frequently given
22 to Card I ("Animal face" or "Mask") and the DS5 on Card 2 ("Rocket" or "Space shuttle") were

1 excluded, as pointed out in the most recent Comprehensive System guidelines (Exner & Erdberg,
2 2005).

3 According to Exner's Comprehensive System (Exner, 2003), the $S>3$ cutoff allows to
4 identify angry cases, i.e., only if the protocol includes more than three S responses it is
5 reasonable to assume that the person harbours considerable anger. Therefore, although
6 dichotomizing continuous data reduces statistical power, in the current study the sample was
7 divided into two groups using the number of S responses as a criterion ($S\leq 3$ versus $S>3$, named
8 Low-S and High-S, respectively), and the exact Mann-Whitney test was used to compare their
9 scores on the other variables.

10 In order to investigate the construct validity of S responses as a measure of anger and
11 aggression, S responses counts were correlated with scores on the other Rorschach variables and
12 on the self-report questionnaires. While the scores obtained on the State Trait Anger Expression
13 Inventory-2 and in the Aggression Questionnaire can reasonably be considered as measured on
14 equal interval scales, the same might not be true for the Rorschach variables considered in this
15 study. This issue is not central to the aim of this work, but it is thoroughly discussed in Viglione
16 (1995). The Spearman's *rho*, which is a measure of association for ordinal variables with similar
17 characteristics to the Pearson's product-moment correlation coefficient (Siegel & Castellan,
18 1988), was used. As the number of Rorschach responses R may affect the magnitude of the
19 variables studied, partial correlations controlling for R were also computed.

20 Since 21 Mann-Whitney tests and 87 correlations (4 S responses \times 21 other Rorschach
21 scores and self-report scores + 3 intercorrelations among the three subtypes of S responses) were
22 computed, the probability of finding at least one significant correlation with an experimentwise
23 α of .05 was .659 (family of 21 Mann-Whitney tests) and .988 (family of 87 correlations).

1 Hence, the inflation of the Type I error was controlled through the adaptive linear step-up
 2 procedure of Benjamini, Krieger and Yekutieli (2006).

3 Results

4 All participants gave at least 14 responses. Inter-rater agreement was excellent (Cohen's
 5 $k=.93$ for S; $.89$ for S subtypes; $.94$ for AG; 1.00 for AgPot, $.93$ for AgC; $.97$ for AgPast). Table 1
 6 reports the descriptive statistics of S responses. Ninety-two percent of the participants gave at
 7 least one S response.

8 [Insert Table 1 about here]

9 The Low-S ($n=26$, 52%) and the High-S ($n=24$, 48%) groups did not show any difference
 10 with respect to gender (Fisher's Exact Test $p=.778$, effect size $r=.04$) or age ($t(48)=0.253$,
 11 $p=.801$, $r=.04$). After the adjustment for multiple comparisons, the only significant difference
 12 was found in AgPot (adjusted exact $p=.035$, $r=.41$) (see also Table 1), with higher scores in the
 13 High-S group.

14 Table 2 shows Spearman's ρ correlations of the different subtypes of S responses with
 15 the other Rorschach variables and scores on self-report questionnaires. As partial correlations did
 16 not substantially differ from zero-order correlations, the latter was taken into account.

17 [Insert Table 2 about here]

18 After adjustment for multiple tests, significant (at least $p<.05$) correlations of S-int with
 19 the "Feel Like Expressing Anger Verbally" subscale ($\rho=-.48$, adjusted $p = .016$) and the "Feel
 20 Like Expressing Anger Physically" subscale ($\rho=-.54$, adjusted $p = .004$), and of S with AgPot
 21 ($\rho=.46$, adjusted $p = .021$) were found.

22 Future replications might also want to take into account those correlations that in this study
 23 were no longer statistically significant after the adjustment of the p -value for multiple

1 comparisons but showed a moderate effect size ($\rho \geq .30$). i.e., the correlations of S-fus with
 2 State Anger subscale ($\rho = .42$, adjusted $p = .052$; note also that this correlation was significant
 3 once the effect of total responses was ruled out), with the “Feel Like Expressing Anger Verbally”
 4 subscale ($\rho = .39$, adjusted $p = .092$), and the Feeling Anger subscale ($\rho = .31$, adjusted $p =$
 5 $.306$); the correlation of S with SumAg ($\rho = .35$, adjusted $p = .193$); the correlation of S-rev
 6 with AgPot ($\rho = .30$, adjusted $p = .331$); the correlation of S-int with the Angry Control In
 7 subscale ($\rho = .31$, adjusted $p = .306$).

8 Discussion

9 The aim of this study was to investigate the association of the frequency of the different subtypes
 10 of S responses to the Rorschach test with Rorschach and self-report measures of anger and
 11 aggression. According to Exner (2003), when the protocol includes more than three S responses
 12 it is reasonable to assume that the person harbours considerable anger, but this study found only
 13 partial support for Exner’s hypothesis, as the only significant difference between High-S and
 14 Low-S was in AgPot, which is a Rorschach score based on responses in which an aggressive act
 15 is about to occur. No significant (at least $p < .05$ after correction for multiple tests) nor substantial
 16 ($\rho > .30$) association was found between the number of S responses and scores on self-report
 17 measures, consistent with the results of Mihura and Nathan Montano (2001). However, the
 18 significant positive association between S responses and AgPot seems to suggest that S responses
 19 are only moderately associated to an aggressive *imagery*.

20 When the three different subtypes of S responses were considered, no significant
 21 correlations for S-rev were found, suggesting a lack of association between S figure-ground
 22 inversion responses and measures of anger and aggression. This result seems to be consistent
 23 with our hypothesis, which, in turn, referred to Fonda’s (1977) hypothesis about different

1 psychological processes connected to S primary responses and to S secondary responses.
2 According to this hypothesis, S-reversal responses are associated with the need for autonomy and
3 mastery (Fonda, 1977). Klopfer and Davidson (1962) also considered them as a marker of Ego
4 strength. Future studies might consider that in this work the association of S-rev with AgPot was
5 not significant only after adjusting the p -value for multiple comparisons, but was substantial
6 ($\rho=.30$).

7 S-int was significantly and negatively correlated with Feeling Like Expressing Anger
8 Verbally (STAXI-2-FLEAV) and feeling like expressing anger physically (STAXI-2-FLEAP).
9 Consistent with the hypothesis of this study, no associations were found with aggression. These
10 findings suggest that the attempt to organize the thinking in order to link the S with other areas
11 might be a marker of the presence of internal sources directed to control anger. Albeit not
12 significant after the adjustment of the p -value for multiple comparisons, the substantial
13 correlation of S-int with the attempt to internally control anger (STAXI-2-AC/in) is consistent
14 with this conclusion and seems to warrant further attention.

15 S-Fusion responses also did not show any significant correlations with the other measures
16 after the adjustment of the p -value for multiple comparisons. However, the correlations with state
17 anger (STAXI-2-S/A) and feeling like expressing anger verbally (STAXI-2-FLEAV) and with
18 feeling anger (STAXI-2-FA) were substantial. Given the potential novelty of these results in the
19 literature, further studies are encouraged in investigating this particular type of response, as it is
20 consistent with Bohm's (1967) hypothesis - he considered it a "particular phenomenon" and an
21 important psychological factor.

22 The interpretation of the lack of significance of the correlations of AgPot with the
23 different subtypes of S responses is somewhat ambiguous, since it is not clear whether it is an

1 effect of an actual negligible association or of the restricted range of scores (half of the
2 participants gave no S-rev, S-int and AgPot responses), possibly due to the relative homogeneity
3 of the sample (university students). Meloy and Gacono (1992) and Gacono and Meloy (1994)
4 used this variable in their studies assuming that it correlated with sadistic personality traits; they
5 found a higher frequency and increased values of AgPot in people suffering from psychopathy.
6 However, studies focused on testing the reliability and validity of Gacono and Meloy's variables
7 of aggression omitted AgPot from their analyses due to a low frequency of this specific variable.
8 These studies thus could not investigate validity of AgPot, although they reported an excellent
9 inter-rater reliability (Baity & Hilsenrotjh, 1999, Liebman, Porcerelli & Abell, 2005). Other
10 studies (Mihura *et al.*, 2013) did not found any association of AgPot with self report measures of
11 aggression and of interpersonal control. Interestingly, in the present study a relatively high
12 percentage of participants (n= 10, 20%) reported AgPot responses, and each of them gave at least
13 3 S responses (range 3-9, $M=5.3$).

14 Future studies are invited to overcome the limitations of this study. Beyond using a larger
15 sample to increase statistical power (and thus detect significant correlations in the moderate
16 range), a more representative sample of the population would be desirable. The participants in
17 the current study were young, student volunteers, that might have introduced a volunteer bias,
18 i.e., higher intelligence, increased need for approval, tendency to be less authoritarian and
19 conforming (e.g., Heiman, 2002). As this bias can limit the external validity of a study, it would
20 be useful that future studies will recruit more representative samples of the general and clinical
21 population. Because of the well-known limitations of the self-report measures, behavioral
22 measures, observer reports and other projective tests should be included in order to obtain a more
23 comprehensive test of the association of the different subtypes of S responses and aggression.

1 It is also necessary to test the hypothesis suggested by some authors (Piotrowski, 1957;
 2 Klopfer, & Davidson, 1962; Pechoux, & Harmand, 1967; Rausch de Traubenberg, 1970)
 3 according to which S responses, especially integration figure-ground responses, might indicate
 4 the presence of positive aggressiveness, i.e., assertive traits, desire of self-affirmation and mental
 5 flexibility. It would also be intriguing to compare groups of individuals with a high number of S
 6 responses and different types of Experience Balance to test the hypothesis proposed by
 7 Rorschach and by Bohm, who suggested that the diagnostic meaning of S responses might
 8 change based on different types of Experience Balance. Moreover, the study of specific
 9 differences related to the experience of anger according to gender could be considered. In this
 10 study we found a significant gender difference only for S-INV (Mann-Whitney $U = 288.50$, $z =$
 11 3.42 , $p = .001$, $r = .48$, women provided more S-INV responses than men), but, given the
 12 limitation about the sample size mentioned above, this result cannot be considered as conclusive.

13 Notwithstanding the aforementioned limitations, while there is not a great deal of
 14 research supporting the interpretative hypothesis of an association between S responses and
 15 awareness of anger, the results of the present study suggest evidence, albeit limited, of an
 16 association between particular categories of S responses and indications of angry/aggressive
 17 tendencies.

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- 15

1 Table 1

2 *Descriptive statistics for the variables included in this study (n=50), reliability of self-report*
 3 *measures (Cronbach's α) and results of the exact Mann-Whitney tests comparing participants*
 4 *with 3 or less S responses (n=26) with participants with at least 4 S responses (n=24)*
 5

Variable	n > 0	M	SD	Mdn	Min	Max	α	MW adj exact p
R	-	21.40	7.64	19	14	46	-	-
S	46	3.40	2.09	3	0	9	-	-
S-rev	19	0.62	1.00	0	0	5	-	-
S-fus	23	2.14	1.77	2	0	9	-	-
S-int	42	0.64	0.85	0	0	4	-	-
Ag	16	0.56	0.97	0	0	4	-	.660
AgC	44	2.68	2.13	2	0	10	-	.378
AgPast	21	0.50	0.65	0	0	2	-	.688
AgPot	10	0.24	0.52	0	0	2	-	.036
sumAG	-	5.76	4.05	5	0	19	-	.378
S/A	-	44.52	6.19	42	42	66	.85	.552
T/A	-	48.44	10.13	48	32	70	.86	.552
AE/out	-	51.72	12.23	46	38	80	.71	.660
AE/in	-	51.72	9.14	50	34	72	.76	.721
AC/out	-	47.88	10.49	50	26	64	.75	.696
AC/in	-	53.20	9.08	54	26	72	.83	.552
FA	-	44.76	9.33	42	42	92	.67	.696
FLEAV	-	45.96	7.80	44	42	82	.82	.378
FLEAP	-	45.76	2.61	46	44	54	.60	.378
AT	-	48.52	11.60	44	34	84	.85	.724
AR	-	48.20	9.26	48	32	68	.72	.552
AE/index	-	50.60	10.32	50	28	70	-	.660
AQ_P	-	21.44	5.35	21	13	35	.78	.688
AQ_V	-	11.02	2.65	11	5	19	.61	.378
AQ_A	-	16.44	3.39	16	9	23	.73	.378
AQ_H	-	15.90	4.23	16	9	26	.77	.552

6 Note: $n > 0$ = number of participants with at least one response; M=Mean; Mdn =Median; SD=Standard Deviation;
 7 Min=Minimum; Max=Maximum; α = Cronbach's alpha; MW adj exact p = Mann-Whitney exact p value after
 8 adjustment for multiple comparisons; R=total Rorschach responses; S=Space responses; S-rev=S reversal S
 9 response; S-int=figure-ground integration S response; S-fus= fusion S response; AG=Aggressive Movement
 10 response; AgC=Aggressive content; AgPast=Aggressive Past; AgPot=Aggressive Potential; SumAG= sum of AG,
 11 AgC, AgPast and AgPot responses; STAXI-2= State-Trait Anger Expression Inventory-2; S/A=State Anger;
 12 T/A=Trait Anger; AE/out= Angry Expression Out; AE/in Angry Expression In; AC/out= Angry Control Out;
 13 AE/in= Angry Control In; FA=Feeling Anger; FLEAV= Feel Like Expressing Anger Verbally; FLEAP= Feel Like
 14 Expressing Anger Physically; AT=Angry Temperament; AR=Angry Reaction; AE index= a global measure of the
 15 expression of anger

1 Table 2
 2 Correlations and partial correlations (Spearman's rho) of frequency of S responses with other
 3 Rorschach and self-report scores (n = 50)
 4

	zero-order rho				rho after controlling for R			
	S	S-rev	S-fus	S-int	S	S-rev	S-fus	S-int
<i>S responses</i>								
S-rev	.44 [§]				.37 [§]			
S-fus	.77 [§]	-.01			.74	-.10		
S-in	.30 [§]	.04	-.09		.31 [§]	.03	-.11	
<i>Rorschach variables</i>								
AG	.22	-.17	.26	.09	.15	-.23	.21	.08
AgC	.28	.18	.14	.05	.09	.05	-.01	.02
AgPast	-.05	-.09	.02	-.13	-.16	-.16	-.04	-.15
AgPot	.46*	.30	.26	.24	.39	.24	.19	.24
SumAG	.35	.26	.23	-.04	.17	.15	.09	-.09
<i>Self-report scales</i>								
STAXI-2-S/A	.26	.01	.42	-.17	.26	-.01	.43*	-.17
STAXI-2-T/A	.11	-.07	.14	-.07	.16	-.05	.18	-.06
STAXI-2-AE/out	.04	.00	.05	-.13	.00	-.03	.02	-.14
STAXI-2-AE/in	.09	.05	.01	.08	.21	.12	.08	.09
STAXI-2-AC/out	-.10	-.07	-.14	.15	-.10	-.06	-.13	.15
STAXI-2-AC/in	-.13	-.06	-.15	.31	-.05	.00	-.09	.33
STAXI-2-FA	.18	.05	.31	-.08	.18	.04	.32	-.08
STAXI-2-FLEAV	.20	.13	.39	-.48*	.16	.10	.37	-.50**
STAXI-2-FLEAP	.12	.11	.28	-.54**	.07	.08	.26	-.56***
STAXI-2-AT	.07	-.11	.14	-.09	.04	-.14	.12	-.09
STAXI-2-AR	.14	.02	.09	.08	.22	.06	.14	.09
STAXI-2-AE Index	.12	.11	.10	-.24	.13	.12	.11	-.24
AQ-PA	.07	.06	.04	-.04	.00	.01	-.01	-.05
AQ-VA	.29	.00	.17	.16	.23	-.06	.12	.16
AQ-A	.26	.12	.20	.06	.13	.03	.11	.04
AQ-H	-.09	-.01	-.09	-.12	-.15	-.04	-.13	-.13

5 Note: R=total Rorschach responses; S=Space responses; S-rev=S reversal S response; S-int=figure-ground
 6 integration S response; S-fus= fusion S response; AG=Aggressive Movement response; AgC=Aggressive content;
 7 AgPast=Aggressive Past; AgPot=Aggressive Potential; SumAG= sum of AG, AgC, AgPast and AgPot responses;
 8 STAXI-2= State-Trait Anger Expression Inventory-2; S/A=State Anger; T/A=Trait Anger; AE/out= Angry
 9 Expression Out; AE/in Angry Expression In; AC/out= Angry Control Out; AC/in= Angry Control In; FA=Feeling
 10 Anger; FLEAV= Feel Like Expressing Anger Verbally; FLEAP= Feel Like Expressing Anger Physically;
 11 AT=Angry Temperament; AR=Angry Reaction; AE index= a global measure of the expression of anger.
 12 §: not corrected for redundancy; *= *p-adj* <.05; **= *p-adj* <.01; ***= *p-adj* <.001 (adjustment by the adaptive linear
 13 step-up procedure, Benjamini, Krieger, & Yekutieli, 2006)